

STUDIES IN THE EUPATORIEAE (ASTERACEAE). CL.
LIMITS OF THE GENUS KOANOPHYLLON.

R. M. King and H. Robinson

Department of Botany

Smithsonian Institution, Washington, D.C. 20560

An initial attempt to delimit the genus Koanophyllum (King & Robinson, 1971) used a rather narrow concept for the genus while acknowledging numerous related species in the West Indies. Various additions to the genus (K. & R., 1972, 1974a, 1974b) have all continued to be within the narrow interpretation. A final analysis of the related groups has indicated that a broader concept of Koanophyllum is preferable. The new complete list of species is included here with indications of some of the closely related genera.

In the broadened concept of Koanophyllum certain characters are given less importance. The inflorescence of the typical element was pyramidal paniculate but in the majority of added species they are corymbose. The anther appendage was usually short and with a median groove but in the broader concept the appendage is often short but most often not grooved. Still, numerous characters remain which help to distinguish the genus. Species of Koanophyllum have comparatively short-petiolate leaves except for K. consanguineum of Brazil. The character is particularly notable in comparisons with many members of the Hebeclinium relationship. The leaves of Koanophyllum are glandular punctate as are the corollas and involucres. Only in K. prinoides have no glands been seen on the leaves under the binocular microscope. The character of glands on leaves and corollas is particularly notable in comparisons with the genus Critonia. The leaves are almost always opposite with subopposite and ternate leaves found only K. myrtilloides. The receptacle of Koanophyllum is bare without either paleae or hairs. The base of the corolla is broadly tubular and scarcely distinct from the limb. The nectary is usually quite large extending upward partly into the broad tubular corolla base. The corolla lobes are relatively broad and often broader than long with numerous glands clustered on the outer surface. The corolla lobes have no hairs or only a few short hairs. The anther collars have the walls of the cells unornamented or weakly ornamented. The strongest annular ornamentation is in K. albicaule. The style base is slender and

smooth and the style tips are often but not always knobbed. The carpopodium has small cells with slightly thickened walls and the pappus when present is persistent with often incrassate setae.

As presently recognized the genus contains a number of unique species and species groups. In the typical element in Central America are K. standleyi having no pappus and K. ravenii having a very short pappus, in Brazil is K. baccharifolium having more strongly hastate bases on the anthers, in Bolivia is K. jugipaniculatum with its unusually large pinnately veined leaves, in Brazil is K. thysanolepis with its large coarse heads and partially dentate phyllaries and also in Brazil is K. myrtilloides with its unique phyllotaxy.

Of particular concern in the genus are the variations in the involucre. Most species have eximbricate phyllaries and some are as marked in this character as any Gyptoid genera. The species with subimbricate rounded phyllaries seem to be scattered through the genus. In the typical element the progression from eximbricate species to the strongly subimbricate condition in K. pittieri is so gradual that taxonomic subdivision above the species level is impossible. The Colombian K. mesoreopolum may be related to this series. Completely different relationship is evident in the scandent K. tetrapterum of Jamaica with its very diffuse panicle and four flowers per head. Two species in Haiti, K. selleanum and K. phaniooides, differ from the genus Osmopsis only in one significant technical feature, the persistent outermost bracts of the involucre. The last two species seem to be part of the taxonomically difficult group in the West Indies derived from hybridization between Chromolaena and Koanophyllum. In all the species of Koanophyllum with subimbricate involucres the phyllaries are relatively broad and blunt. The more acute forms of Grisebachianthus and the more elongate involucres of Lorentzianthus and Fleischmanniopsis seem to represent yet more separately derived but related types.

Some of the genera related to Koanophyllum have been mentioned in previous papers of this series. Sphaereupatorium of South America and Mexianthus and Neohintonia of Central America are all notable for the spherical form of the inflorescences and the latter two have only one flower in each individual head. Eupatoriastrum of Central America is distinct by the heads with ca. 300 flowers and prominent paleae. In the West Indies Grisebachianthus can be distinguished from Koanophyllum by the tomentose leaves and stems combined with the imbricated acute-tipped phyllaries.

Osmopsis is technically Praxeloid by its totally deciduous involucre. Related South American genera include Ophryosporus of the classical genera, the more recently described Badilloa and Vittetia, and the genera Chacoa, Lorentzianthus and Idiothamnus described in accompanying papers. Ophryosporus differs from Koanophyllum by the anther appendage almost totally vestigial, the phyllaries few and totally eximbricate, and the corolla base narrower. Badilloa has broader strap-shaped style branches and mostly larger pollen. Vittetia was originally thought of as Gyptoid because of its extremely papillose style branch. The genus is further distinguished from Koanophyllum by the very narrow base of the corolla. Idiothamnus is distinct by the paleaceous receptacle and has a rather distinctive habit with large pinnately veined ascending leaves. Chacoa differs from Koanophyllum by narrow based corollas and one of the species has distinctly alternate leaves. The monotypic Lorentzianthus has strongly sub-imbricate elongate involucres and has long-petiolate leaves similar to members of the Hebeclinium relationship.

There are some species of Stomatianthes that have corollas resembling Koanophyllum and confusion might result if style bases are not observed carefully.

Our expanded concept of the genus indicates that it contains the following 109 species. The species preceded by an asterisk (*) have not previously been placed in the genus.

* Koanophyllum adamantium (Gardn.) R.M.King & H.Robinson, comb. nov. Eupatorium adamantium Gardn. in Lond. J. Bot. 5:477. 1846. Brazil.

Koanophyllum albicaule (Schultz-Bip. ex Klatt) K. & R., Phytologia 22(3):149. 1971. Eupatorium albicaule Schultz-Bip. ex Klatt, Leopoldina 20:89. 1884. Mexico.

* Koanophyllum atroglandulosum (Alain) R.M.King & H. Robinson, comb. nov. Eupatorium atroglandulosum Alain, Contr. Ocas. Mus. Hist. Nat. Col. 'de La Salle' Habana 18:3. 1960. Cuba. Included here on basis of description; see Alain 1960.

* Koanophyllum ayapanoides (Griseb.) R.M.King & H. Robinson, comb. nov. Eupatorium ayapanoides Griseb., Cat. Pl. Cub. 146. 1866. Cuba.

- * Koanophyllum baccharifolium (Gardn.) R.M.King & H. Robinson, comb. nov. Eupatorium baccharifolium Gardn., Lond. J. Bot. 4:116. 1845. Brazil.
- * Koanophyllum barahonense (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium barahonense Urb., Fedde Repert. 17:10. 1921. Hispaniola.
- * Koanophyllum breviflorum (Alain) R.M.King & H. Robinson, comb. nov. Eupatorium breviflorum Alain, Contr. Ocas. Mus. Hist. Col. 'de la Salle' Habana. Included only on basis of description; see Alain 1960. Cuba.
- * Koanophyllum bullescens (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium bullescens B.L. Robinson, Contr. Gray Herb. n.s. 51:533. 1916. Cuba.
- * Koanophyllum cabaionum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium cabaionum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A (11):65. 1931. Haiti.
- * Koanophyllum calcicola (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium calcicola Urb. Symb. Ant. 5:524. 1908. Hispaniola.
- Koanophyllum celtidifolium (Lam.) K. & R. Phytologia 22(3):149. 1971. Eupatorium celtidifolium Lam., Encyc. 2:406. 1788. Syn. Eupatorium plicata Urban, Symb. Antill 5:523. 1906. Colombia, Ecuador, Guatemala?, Jamaica, Lesser Antilles, Peru, Venez.
- * Koanophyllum chabrense (Urban & Ekman) R.M.King & H. Robinson, comb. nov. Eupatorium chabrense Urban & Ekman, Arkiv. Bot. (Stockh.) 23A(11):58. 1931. Haiti.
- * Koanophyllum chalceorithales (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium chalceorithales B.L.Robinson, Contr. Gray Herb. n.s. 77:10. 1926. Cuba.
- * Koanophyllum clementis (Alain) R.M.King & H. Robinson, comb. nov. Eupatorium clementis Alain, Contr. Ocas. Mus. Hist. Col. 'de la Salle' Habana 18:4. 1960. Cuba.

- * Koanophyllum consanguineum (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium consanguineum A. P. Decandolle, Prodr. 5:166. 1836. Brazil.
- Koanophyllum coulteri (B.L.Robinson) K. & R., Phytologia 22(3):149. 1971. Eupatorium coulteri B.L.Robinson, Proc. Amer. Acad. 36:477. 1901. Guatemala.
- * Koanophyllum cubense (A.P.Decandolle) R.M.King & H. Robinson, comb. nov. Eupatorium cubense A.P. Decandolle, Prodr. 5:172. 1836. Cuba.
- * Koanophyllum cynanchifolium (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium cynanchifolium A.P.Decandolle, Prodr. 5:172. 1836. Cuba.
- * Koanophyllum delpechianum (Urban & Ekman) R.M.King & H.Robinson, comb. nov. Eupatorium delpechianum Urban & Ekman, Arkiv Bot. (Stockh.) 23A (11):60. 1931. Haiti.
- * Koanophyllum dolicholepis (Urban) R.M.King & H.Robinson, comb. nov. Eupatorium villosum var. dolicholepis Urban, Fedde Repert. 17:52. 1921. Puerto Rico.
- * Koanophyllum dolphinii (Urban) R.M.King & H.Robinson, comb. nov. Eupatorium dolphinii Urban, Symb. Ant. 5:522. 1908. Jamaica.
- * Koanophyllum droserolepis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium droserolepis B.L.Robinson, Proc. Amer. Acad. 54:243. 1918. Puerto Rico.

Koanophyllum dukei K. & R. Phytologia 28(1):68. 1974.
Panama.

Koanophyllum eitenii R.M.King & H.Robinson, sp. nov.
Plantae frutescentes erectae usque ad 1.5 m altae
mediocriter ramosae. Caules teretes striati fulvi
dense hispiduli. Folia opposita breviter petiolata,
petiolis 2-3 mm longis; laminae late ovatae 1.5-2.5 mm
longae 1.2-2.0 mm latae base cordatae trinervatae vel
quinquenervatae margine serrulatae apice acutae vel
minute acuminatae supra glabrae lucidae subtus glandulo-
punctatae in nervis et nervulis minute puberulae.
Inflorescentiae corymboso-paniculatae, ramis ultimis
1-6 mm longis minute puberulis et glanduliferis. Capit-
ula 6-7 mm alta; squamae involucri ca. 20 eximbricatae

lanceolatae plerumque 4-5 mm longae extus minute puberulae vel subglabrae bicostatae apice anguste acutae vel acuminate marginae non scariosae; receptacula plana glabra. Flores ca. 17 in capitulo; corollae ca. 3.5 mm longae plerumque tubulosae extus plerumque glabrae, lobis ca. 0.4 mm longis aequilateraliter triangularibus extus dense glanduliferis; filamenta in parte superiore brevia 0.1 mm longa; thecae ca. 1.1 mm longae; appendices antherarum oblongo-ovatae ca. 0.2 mm longae; appendices stylorum filiformes leniter mamillosae apice vix clavatae. Achaenia 1.5-1.8 mm longa sparse glandulifera; carpopodia brevia lata, cellulis ca. 8-seriatus subquadratis 10-16 μ diam, parietibus incrassatis; setae pappi ca. 30 ca. 3.0-3.5 mm longae inferne remote scabridae apice leniter incrassatae, cellulis apicalibus subacutis vel obtusis. Grana pollinis 20-22 μ diam.

TYPE: BRAZIL: Goias: Municipio de Caldas Novas: at headwaters of the creek, Rio Quente, at the hotel, "Pousada do Rio Quente", 13° km WSW of city of CALDAS NOVAS. 17° 48'S. 48° 45'W. 21 Dec 1974.
Heringer & Eiten 14155 (Holotype US).

The new species is of a habit similar to many West Indian members of the genus but the only species with similar appearance in Brazil is K. myrtilloides. The latter species happens to differ rather strikingly by its phyllotaxy which is unique in the genus. In K. eitenii the leaves are opposite but in K. myrtilloides the leaves of the main stems are ternate while those of the branches become subopposite or alternate.

* Koanophyllum ekmanii (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium ekmanii B.L.Robinson, Contr. Gray Herb. n.s. 77:15. 1926. Cuba.

* Koanophyllum flavidulum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium flavidulum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A (II):61. 1931. Haiti.

Koanophyllum flexile (B.L.Robinson) K. & R. Phytologia 22(3):150. 1971. Eupatorium flexile B.L.Robinson, Proc. Amer. Acad. 55:14. 1919. Peru.

* Koanophyllum fuscum (N.E.Brown) R.M.King & H. Robinson, comb. nov. Eupatorium fuscum N.E.Brown, Trans. Lin. Soc. ser.2 6:39. 1901. Venezuela.

- * Koanophyllum gabbii (Urb.) R.M.King & H.Robinson,
comb. nov. Eupatorium gabbii Urb., Fedde Repert.
17:50. 1921. Hispaniola.
 - * Koanophyllum gibbosum (Urb.) R.M.King & H.Robinson,
comb. nov. Eupatorium gibbosum Urb., Fedde Report.
17:49. 1921. Hispaniola.
 - * Koanophyllum gracilicaule (Sch.-Bip. ex B.L.Robinson)
R.M.King & H.Robinson, comb. nov. Eupatorium
gracilicaule Sch.-Bip. ex B.L.Robinson, Proc.
Amer. Acad. 42:39. 1906. Mexico.
 - * Koanophyllum gracilipes (Urb.) R.M.King & H.Robinson,
comb. nov. Eupatorium gracilipes Urb., Symb. Antill.
5:522. 1908. Jamaica.
 - * Koanophyllum gundlachii (Urb.) R.M.King & H.Robinson,
comb. nov. Eupatorium gundlachii Urb., Symb. Antill.
3:399. 1903. Cuba.
 - * Koanophyllum hammatocladum (B.L.Robinson & N.L.Britton)
R.M.King & H.Robinson, comb. nov. Eupatorium
hammatocladum B.L.Robinson & N.L.Britton, Proc.
Amer. Acad. 54:246. 1918. Jamaica.
 - * Koanophyllum hardwarense (G.R.Proctor & C.D.Adams) R.
M.King & H.Robinson, comb. nov. Eupatorium hard-
warense G.R.Proctor & C.D.Adams, Phytologia 21:
409. 1971. Jamaica.
 - * Koanophyllum helianthemooides (B.L.Robinson) R.M.King
& H.Robinson, comb. nov. Eupatorium helianthemooides
B.L.Robinson, Contr. Gray Herb. n.s. 77:17. 1926.
Cuba.
 - * Koanophyllum heptaneurum (Urb.) R.M.King & H.Robin-
son, comb. nov. Eupatorium heptaneurum Urb., Symb.
Antill. 7:554. 1913. Dominican Republic.
 - * Koanophyllum hidrodes (B.L.Robinson) R.M.King & H.
Robinson, comb. nov. Eupatorium hidrodes B.L.Rob-
inson, Contr. Gray Herb. n.s. 73:12. 1924. Cuba.
- Koanophyllum hondurensense (B.L.Robinson in Standley) K.
& R., Phytologia 22(3):150. 1971. Eupatorium
hondurensense B.L.Robinson in Standley, J. Arnold
Arb. 11:44. 1930. Honduras.

* Koanophyllum hotteanum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium hotteanum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11):63. 1931. Haiti.

Koanophyllum huantae (B.L.Robinson) K. & R., Phytologia 22(3):150. 1971. Eupatorium huantae B.L.Robinson, Contr. Gray Herb. n.s. 104:16. 1934. Peru.

Koanophyllum hylonomum (B.L.Robinson) K. & R., Phytologia 22(3):150. 1971. Eupatorium hylonomum B.L. Robinson, Proc. Bost. Soc. Nat. Hist. 31:250. 1904. Costa Rica.

Koanophyllum hypomalacum (B.L.Robinson ex J.D. Smith) K. & R., Phytologia 22(3):150. 1971. Eupatorium hypomalacum B.L.Robinson ex J.D.Smith, Bot. Gaz. 35:4. 1903. Guatemala.

* Koanophyllum incisum nom. nov. R.M.King & H.Robinson, Eupatorium incisum Griseb., Cat. Pl. Cub. 146. 1866. not Eupatorium incisum L.C.M.Rich. 1792. Dominican Republic.

* Koanophyllum isillumense (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium isillumense B.L. Robinson, Proc. Amer. Acad. 55:20. 1919. Peru.

* Koanophyllum iteophyllum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium iteophyllum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11):57. 1931. Haiti.

* Koanophyllum jaegerianum (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium jaegerianum Urb., Symb. Antill. 3:394. 1903. Haiti.

* Koanophyllum jensenii (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium jensenii Urb., Arkiv. Bot. (Stockh.) 17(7):64. 1921. Haiti.

* Koanophyllum jugipaniculatum (Rusby) R.M.King & H. Robinson, comb. nov. Eupatorium jugipaniculatum Rusby, Bull. New York Bot. Gard. 4:379. 1907. Bolivia.

* Koanophyllum juninense (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium juninense B.L.Robinson, Contr. Gray Herb. n.s. 77:20. 1926. Peru.

- * Koanophyllum kavanayense (Badillo) R.M.King & H.Robinson, comb. nov. Eupatorium kavanayense Badillo, Bol. Soc. Venez. Cienc. Nat. 10:293. 1946. Venezuela,
- * Koanophyllum lindenianum (A.Rich.) R.M.King & H.Robinson, comb. nov. Eupatorium lindenianum A.Rich. in Sagra, Fl. Cub. Fanerog. 3:42. 1853. Cuba.
- * Koanophyllum littorale R.M.King & H.Robinson, nom. nov. Eupatorium littorale Alain, Contr. Ocas. Mus. Hist. Nat. Col. 'de la Salle' Habana 18:4. 1960. not Eupatorium littorale Cabrera, 1959. Cuba.
- Koanophyllum lobatifolium (Cabrera) K. & R., Phytologia 29(2):123. 1974. Eupatorium lobatifolium Cabrera, in Cabrera & Vittet, Sellowiana 15:192. 1963. Brazil.
- Koanophyllum longifolium (B.L.Robinson) K. & R., Phytologia 22(3):150. 1971. Eupatorium longifolium B.L.Robinson, Proc. Amer. Acad. 36:480. 1901. Mexico.
- * Koanophyllum maestrense (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium maestrense Urb., Symb. Ant. 3:397. 1903. Cuba.
- * Koanophyllum mesoreopolum (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium mesoreopolum B.L.Robinson, Contr. Gray Herb. n.s. 73:15. 1924 Colombia.
- * Koanophyllum microchaetum (Urb. & Ekm.) R.M.King & H.Robinson, comb. nov. Eupatorium microchaetum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(II):62. 1931. Hispaniola.
- Koanophyllum mimicum (Standl. & Steyermark) K. & R., Phytologia 22(3):150. 1971. Eupatorium mimicum Standl. & Steyermark, Publ. Field Mus. Nat. Hist. Chicago, Bot. Ser. 23:186. 1944. Guatemala.
- * Koanophyllum minutifolium (Alain) R.M.King & H.Robinson, comb. nov. Eupatorium minutifolium Alain, Contr. Ocas. Mus. Hist. Nat. Col. 'de la Salle' Habana 18:5. 1960. Cuba.
- * Koanophyllum miragoanae (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium miragoanae Urb. Fedde Rep. 17:11. 1921. Haiti.

- * Koanophyllum montanum (Sw.) R.M.King & H.Robinson, comb. nov. Eupatorium montanum Swartz, Nov. Gen. & Sp. Pl. Prodr. III: 1788. Jamaica.
 - * Koanophyllum mornicola (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium mornicola um Urb. & Ekm. Arkiv. Bot. (Stockh.) 23A(II):65. 1931. Haiti.
 - * Koanophyllum muricatum (Alain) R.M.King & H.Robinson, comb. nov. Eupatorium muricatum Alain, Contr. Ocas. Mus. Hist. Nat. Col. 'de la Salle', Habana 18:8. 1960. Cuba.
 - * Koanophyllum myrtilloides (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium myrtilloides A.P.Decandolle, Prodr. 5:165. 1836. Brazil.
 - * Koanophyllum nervosum (Swartz) R.M.King & H.Robinson, comb. nov. Eupatorium nervosum Swartz, Nov. Gen. & Sp. Pl. Prodr. III. 1788. Hispaniola.
 - * Koanophyllum nudiflorum (A.Rich.) R.M.King & H.Robinson, comb. nov. Eupatorium nudiflorum A.Rich. in Sagra Fl. Cub. Fanerog. 3:41. 1853. Cuba.
 - * Koanophyllum obtusissimum (A.P.Decandolle) R.M.King & H.Robinson, comb. nov. Eupatorium obtusissimum A.P.Decandolle, Prodr. 5:173. 1836. Dominican Republic.
 - * Koanophyllum oligadenium (Alain) R.M.King & H.Robinson, comb. nov. Eupatorium oligadenium Alain, Contr. Ocas. Mus. Hist. Nat. Col. 'de la Salle', Habana. 18:7. 1960. Included only on basis of description, see Alain (1960). Cuba.
 - * Koanophyllum pachyneurum (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium pachyneurum Urb., Fedde Repert. 17:10. 1921. Hispaniola.
- Koanophyllum palmeri (Gray) K. & R. Phytologia 22(3): 150. 1971. Eupatorium palmeri Gray, Proc. Amer. Acad. 21:383. 1886. Mexico.
- Koanophyllum panamense K. & R., Phytologia 28(1):67. 1974. Panama.
- * Koanophyllum paucicrenatum (Urb. & Ekm.) R.M.King & H.Robinson, comb. nov. Eupatorium paucicrenatum

Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11):59.
1931. Hispaniola.

- * Koanophyllum phanioides (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium phanioides Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11):54. 1931. Haiti.
- * Koanophyllum picardae (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium picardae Urb., Fedde Repert. 17:51. 1921. Haiti.
- * Koanophyllum pitonianum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium pitonianum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11):64. 1931. Haiti.

Koanophyllum pittieri (Klatt) K. & R. Phytologia 22(3): 150. 1971. Eupatorium pittieri Klatt, Bull. Soc. Bot. Belg. 31:192. 1892 (1893). Costa Rica, Mexico.

- * Koanophyllum polyodon (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium polyodon Urb. Symb. Antill. 1:462. 1900. Puerto Rico.
- * Koanophyllum polystictum (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium polystictum Urb., Symb. Antill. 3:400. 1903. Cuba.
- * Koanophyllum porphyrocladum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium porphyrocladum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(11): 56. 1931. Haiti.
- * Koanophyllum prinodes (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium prinodes B.L.Robinson, Contr. Gray Herb. n.s. 77:30. 1926. Cuba.

Koanophyllum pseudoperfoliatum (Schultz-Bip. ex Klatt) K. & R., Phytologia 22(3):150. 1971. Eupatorium pseudoperfoliatum Schultz-Bip. ex Klatt, Leopoldina 20:75. 1885. Mexico.

- * Koanophyllum puberulum (A.P.Decandolle) R.M.King & H. Robinson, comb. nov. Eupatorium puberulum A.P.Decandolle, Prodr. 5:172. 1836. Hispaniola.

Koanophyllum ravenii K. & R., Phytologia 22(3):150. 1971. Mexico.

- * *Koanophyllum reversum* (Urb.) R.M.King & H.Robinson, comb. nov. *Eupatorium reversum* Urb., Arkiv. Bot. (Stockh.) 7(7):64. 1922. Haiti.
- * *Koanophyllum rhexioides* (B.L.Robinson) R.M.King & H. Robinson, comb. nov. *Eupatorium rhexioides* B.L. Robinson, Proc. Amer. Acad. 51:535. 1916. Syn. *E. cristalense* Urb. Cuba.
- * *Koanophyllum rubroviolaceum* (Urb. & Ekm.) R.M.King & H.Robinson, comb. nov. *Eupatorium rubroviolaceum* Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(II):62. 1931. Haiti.
- * *Koanophyllum scabriuscum* (Urb. & Ekm.) R.M.King & H.Robinson, comb. nov. *Eupatorium scabriuscum* Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(II):59. 1931. Haiti.
- * *Koanophyllum sciatriphes* (B.L.Robinson) R.M.King & H.Robinson, comb. nov. *Eupatorium sciatriphes* B.L.Robinson, Proc. Amer. Acad. 54:257. 1918. Hispaniola, Venezuela.
- * *Koanophyllum selleanum* (Urb.) R.M.King & H.Robinson, comb. nov. *Eupatorium selleanum* Urb., Fedde Repert. 17:9. 1921. Haiti.
- * *Koanophyllum semicrenatum* (Urb.) R.M.King & H.Robinson, comb. nov. *Eupatorium semicrenatum* Urb., Symb. Antill. 3:398. 1903. Hispaniola.
- * *Koanophyllum silvaticum* (B.L.Robinson) R.M.King & H.Robinson, comb. nov. *Eupatorium silvaticum* B.L. Robinson, Contr. Gray Herb. n.s. 77:37. 1926. Cuba.
- * *Koanophyllum simile* (Proctor) R.M.King & H.Robinson, comb. nov. *Eupatorium simile* Proctor, Bull. Inst. Jam. Sci. Ser., no. 16:71. 1967. Jamaica.
- Koanophyllum simillimum* (B.L.R.) K. & R., Phytologia 22(3):151. 1971. *Eupatorium simillimum* B.L.R., Contr. Gray Herb. n.s. 77:38. 1926. Argentina, Paraguay.
- Koanophyllum solidaginifolium* (Gray) K. & R., Phytologia 22(3):151. 1971. *Eupatorium solidaginifolium* Gray, Smiths. Contr. Knowl. 3(5):87. 1852. Ariz., N. Mex., Tex., Northern Mexico.

Koanophyllum solidaginoides (H.B.K.) K. & R., *Phytologia* 22(3):151. 1971. Eupatorium solidaginoides H.B.K., Nov. Gen. et Sp. 4:126. 1818. Ed. Folio. Braz., Colo., Costa Rica, Ecuad., Honduras, Mex., Panama, Peru, El Salvador, Venez.

Koanophyllum sorensenii K. & R., *Phytologia* 23(4):395. 1972. British Honduras.

Koanophyllum standleyi (B.L.R.) K. & R., *Phytologia* 22(3):151. 1971. Piqueria standleyi B.L.R., Contr. Gray Herb. n.s. 104:4. 1934. El Salvador.

Koanophyllum stipuliferum (Rusby) K. & R., *Phytologia* 22(3):151. 1971. Eupatorium stipuliferum Rusby, Mem. Torrey Bot. Club. 4:210. 1895. Argentina, Bolivia.

* Koanophyllum subpurpureum (Urb. & Ekm.) R.M.King & H. Robinson, comb. nov. Eupatorium subpurpureum Urb. & Ekm., Arkiv. Bot. (Stockh.) 23A(II):66. 1931. Dominican Republic.

* Koanophyllum tapeinanthum (Urb.) R.M.King & H. Robinson, comb. nov. Eupatorium tapeinanthum Urb., Fedde Repert. 17:51. 1921. Haiti.

* Koanophyllum tatei (B.L.Robinson) R.M.King & H. Robinson, comb. nov. Eupatorium tatei B.L.Robinson, Bull. Torrey Bot. Club 58:484. 1931. Venezuela.

* Koanophyllum tetranthum (Griseb.) R.M.King & H. Robinson, comb. nov. Eupatorium tetranthum Griseb., Fl. Brit. W. Ind. 360. 1861. Jamaica.

* Koanophyllum thysanolepis (B.L.Robinson) R.M.King & H.Robinson, comb. nov. Eupatorium thysanolepis B.L.Robinson, Contr. Gray Herb. n.s. 75:13. 1925. In many herbaria as E. hebecladium DC. Some were corrected by B. L. Robinson. The type of the latter species has been seen and seems to be Barrosoa candolleana (Hook. & Arn.) K. & R. Brazil.

Koanophyllum tinctorium Arruda da Camara, Discurso sobre utilidade da instituicao de jardins nas principaes provincias do Brazil, --- p 38? 1810. syn. Eupatorium laeve A.P.Decandolle. Brazil.

- * Koanophyllum tricephalotes (Schultz-Bip. ex Baker) R.M.King & H.Robinson, comb. nov. Eupatorium tricephalotes Schultz-Bip. ex Baker, in Mart., Fl. Bras. 6(2):322. 1876. Brazil.
- * Koanophyllum triradiatum (Urb.) R.M.King & H.Robinson, comb. nov. Eupatorium triradiatum Urb., Symb. Antill. 3:396. 1903. Haiti.
- * Koanophyllum villosum (Swartz) R.M.King & H.Robinson, comb. nov. Eupatorium villosum Swartz, Nov. Gen. & Sp. Pl. Prodr. lll. 1788. syn. Eupatorium poeppigii Spreng.? S. Florida, Greater Antillarum.

Koanophyllum wetmorei (B.L.R.) K. & R., Phytologia 28(1):67. 1974. Eupatorium hypomalacum var. wetmorei B.L.Robinson, Contr. Gray Herb. n.s. 104: 17. 1934. Panama.

References

- King, R.M. & H.Robinson. 1971. Studies in the Eupatorieae (Asteraceae). LXIV. The genus, Koanophyllum. Phytologia 22(3):147-152.
- ____ & ____ 1972. Studies in the Eupatorieae (Asteraceae). LXXII. Notes on the genus, Koanophyllum. Phytologia 23(4):395-396.
- ____ & ____ 1974a. Studies in the Eupatorieae (Asteraceae). CXX. Additions to the genus, Koanophyllum in Panama. Phytologia 28(1):67-72.
- ____ & ____ 1974b. Studies in the Eupatorieae (Asteraceae). CXXX. Notes on Campuloclinium, Koanophyllum, Mikania and Symphyopappus. Phytologia 29(2):123-129.

Acknowledgement

This study was supported in part by the National Science Foundation Grant BMS 70-00537 to the senior author.



Koanophyllum eitenii R.M. King &
H. Robinson, Holotype

272591

Koanophyllum eitenii R.M. King & H. Robinson, Holotype,
United States National Herbarium. Photos by Victor E.
Krantz, Staff Photographer, National Museum of Natural
History.



Koanophyllum eitenii R.M.King & H.Robinson,
Enlargement of heads.